

THE CLAIMS

What is claimed is:

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1. A capillary electrophoresis system, comprising:

a plurality of capillaries positioned in parallel to each other forming a plane, wherein the capillaries are configured to allow samples to migrate therethrough;

10 a light source configured to illuminate the capillaries and the samples therein, to thereby cause the samples to emit light; and

15 a lens configured to receive the light emitted by the samples, wherein the lens is positioned directly over a first group of the capillaries and obliquely over a second group of the capillaries, wherein each of the first and second groups of capillaries comprises at least one of the capillaries, and

20 wherein the light source is further configured to illuminate the second group of capillaries more than the first group of the capillaries such that amount of light received by the lens from the first group of capillaries is substantially identical to amount of light received from the second group of capillaries when an identical amount of the samples is migrating through the first and second group capillaries.

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2. The system according to claim 1, wherein the light source further comprises:

a laser configured to produce a laser beam;

30 a scanning mirror optically coupled to the laser to receive the laser beam and configured to be oscillated, the scanning mirror positioned to aim the received laser beam at the capillaries; and

a control device operatively coupled to the scanning mirror, the control device configured to control the oscillation of the scanning mirror, to thereby cause the laser beam from the scanning mirror to illuminate the plurality of capillaries.

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3. The system according to claim 2, wherein the light source further comprises:

a convex lens optically coupled to the stationary mirror and the scanning mirror.

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4. The system according to claim 2, wherein the light source further comprises:

a cylindrical lens optically coupled to the scanning mirror, wherein the cylindrical lens is positioned to focus the laser beam on the plurality of capillaries.

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5. The system according to claim 2, wherein the plane formed by the plurality of capillaries has a coincident axis extending parallel to the lengths of the capillaries,

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wherein the scanning mirror aims the laser beam through a scanning plane which is formed by a locus of the laser beam illuminating the capillaries, and

wherein the laser beam impinges on the capillaries at an angle of 45° - 90° formed between the scanning plane and the coincident axis.

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6. The system according to claim 5, wherein the plane formed by the plurality of capillaries has a transverse axis extending parallel to the widths of the capillaries,

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wherein the scanning plane has a central beam line extending from the scanning mirror to a center point among the capillaries illuminated by the laser beam, and

wherein the laser beam impinges on the capillaries at an angle of 1° - 90° formed between the transverse axis and the central beam line.

- 5 7. The system according to claim 2, further comprising
 a magnet rotor connected to the scanning mirror, the rotor
 configured to oscillate the scanning mirror;
 wherein the control device comprises:
 a waveform generator coupled to the scanning mirror,
10 the waveform generator configured to produce a sinusoidal
 waveform to drive the rotor.
8. The system according to claim 1 further comprising:
 a mount having a surface configured to place the capillaries
15 thereon and defining a chamber with an opening, wherein the
 chamber is configured to trap light when light enters through the
 opening.
9. The system according to claim 1 further comprising:
20 a housing configured to cover the capillaries illuminated
 by the light source, the housing defining a first opening and a
 second opening;
 a first light conduit connected between the light source and
 the first opening;
25 a second light conduit connected between the lens and the
 second opening, wherein the housing and the first and second
 conduits provide a light shield.
10. The system according to claim 1, wherein the plurality of
30 capillaries includes at least 384 capillaries.
11. A capillary electrophoresis method, comprising:

introducing samples to a plurality of capillaries positioned in parallel to each other forming a plane and forming a first group and a second group of capillaries, wherein the first and second groups include at least one of the capillaries;

5 causing the samples to migrate through the capillaries; and
illuminating the second group of capillaries more than the first group of the capillaries such that amount of light received by a lens from the first group of capillaries is substantially identical to amount of light received from the second group of
10 capillaries when an identical amount of the samples is migrating through the first and second group capillaries, wherein the lens is positioned directly above the first group of capillaries and obliquely over the second group of capillaries.

15 12. The method according to claim 11,
measuring amount of light received by the lens from the first and second groups of capillaries, while:

20 injecting an identical amount of the samples into the first and second capillaries; and

illuminating the first and second groups of capillaries with substantially identical amount of light; and subsequently
calculating a difference between the amount of light received by the lens from the first and second groups of
25 capillaries.

13. The method according to claim 12, the illuminating step further comprising:

30 generating a compensating laser beam that substantially eliminates the calculated difference,

wherein the capillaries are illuminated by the compensating laser beam.

14. The method according to claim 13,
wherein the step of generating the compensating laser beam
further comprises:

producing a laser beam;

5 receiving the laser beam by a scanning mirror; and

oscillating the scanning mirror to generate the compensating
laser beam.

15. The method according to claim 14,

10 wherein the step of oscillating the scanning mirror further
comprises:

generating a controlling waveform to control the oscillation
of the scanning mirror, wherein the controlling waveform is one
of sinusoidal and triangular waveforms.

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16. The method according to claim 15,

wherein the step of oscillating the scanning mirror further
comprises:

20 generating a controlling waveform to control the oscillation
of the scanning mirror, wherein the controlling waveform is a
combination of sinusoidal, square and triangular waveforms.